



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,706	10/22/2003	Jung Hyun Lee	2336-214	4635

7590 06/03/2005

LOWE HAUPTMAN GILMAN & BERNER, LLP
1700 Diagonal Road, Suite 310
Alexandria, VA 22314

EXAMINER

ROJAS, OMAR R

ART UNIT PAPER NUMBER

2874

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/689,706

Applicant(s)

LEE ET AL.

Examiner

Omar Rojas

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-13 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on October 22, 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: Detailed Action.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the movable optical waveguide that rotates centering around the optical axes (see claims 5 and 13) and the differential circuit unit (see claim 3) must be shown or the feature(s) canceled from the claim(s). Also, the movable electrode unit hinged to the substrate and the first and second terminals (see claim 8) must be shown or the features cancelled from the claim. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will

Art Unit: 2874

be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. **Claims 1-7 and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2003-172885 (hereinafter "JP '885") in view of Patent Publication No. 2002/0054748 to Hsu (hereinafter "Hsu"). JP '885 is a foreign counterpart application to U.S. Patent No. 6,459,845 (hereinafter "the '845 patent").**

Art Unit: 2874

Regarding claim 1, JP '885 discloses a MEMS (Micro Electro Mechanical System) variable optical attenuator (e.g., see Figure 4) comprising:

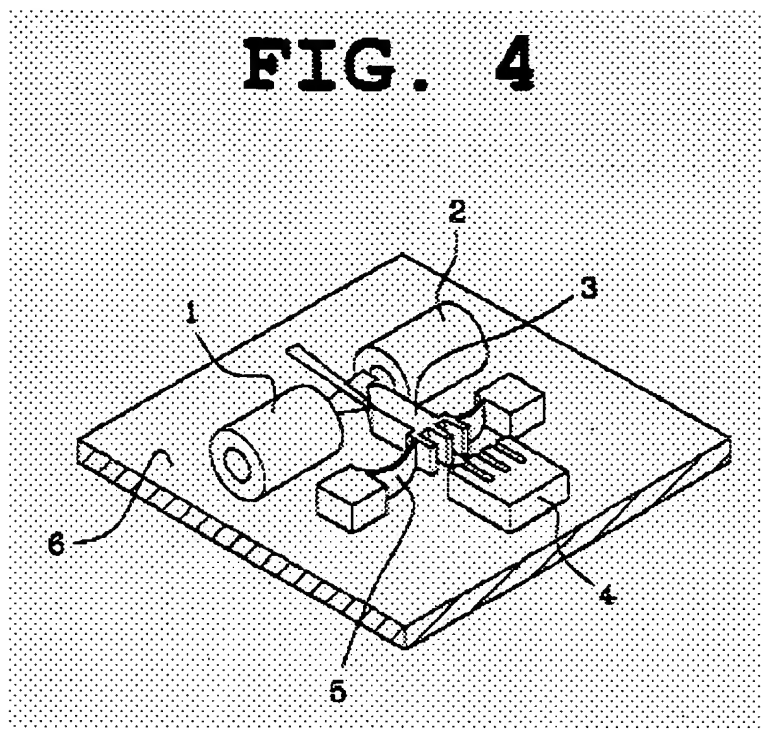
- a substrate 6 having a flat upper surface;

- optical transmitting and receiving terminals (1, 2) arranged on the upper surface of the substrate so that optical axes of the terminals coincide with each other;

- a movable optical shutter 3 arranged at a location such that it attenuates the maximum amount of light transmitted between the optical transmitting and receiving terminals;

- a micro actuator 4 arranged on the substrate for moving the movable optical waveguide;

- and a voltage supply unit (inherent, not shown) for supplying driving voltage to the micro actuator 4 , wherein the micro actuator 4 moves the movable optical shutter so that the light attenuation amount is decreased in accordance with the increase in the driving voltage applied by the voltage supply unit. See the '845 patent at column 5, line 3 to column 6, line 5. Figure 4 is reproduced below.



Regarding claim 2, see Figure 10 and column 5, lines 55-65 of the '845 patent.

Regarding claim 3, the differential circuit unit is shown in Figure 13.

Regarding claim 4, the movable optical shutter 4 moves in the direction perpendicular to the optical axes as shown in Figures 5-6.

Regarding claim 6, the micro actuator 4 includes: a movable electrode unit arranged on the substrate and provided with a first comb unit moving in the direction perpendicular to the optical axes; and a driving electrode unit fixed to the substrate and provided with a second comb unit interdigitated with the first comb unit as seen in Figure 4.

Art Unit: 2874

Regarding claim 7, compare Figure 4 of JP '885 with Figure 4a of the application drawings.

Thus, JP '885 only differs from claims 1-4 and 6-7 in that a movable optical shutter is used, instead of a movable optical waveguide.

Hsu, on the other hand, teaches an optical attenuator device that uses a movable optical waveguide 36 instead of a shutter.

Hsu teaches that movable shutters have disadvantages (Hsu, paragraph [0009]). Hsu also teaches that using movable optical waveguides can be cost effective (Hsu, paragraph [0010]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to obtain the invention specified by claims 1-4 and 6-7 by replacing the shutter taught in JP '885 with the cost effective movable waveguide taught by Hsu.

Regarding claims 9, 10, and 12, the recited method steps are also suggested by JP '885 combined with Hsu. See the previous remarks.

Regarding claim 11, comparing Figures 2 and 3 of JP '885 reveal that the driving voltage is inversely proportional to the input voltage. Therefore, claim 11 is also considered obvious when JP '885 is combined with Hsu for the reasons previously mentioned.

Art Unit: 2874

Regarding claims 5 and 13, Hsu shows in his Figure 3 that his movable optical waveguide 50 rotates centering around the optical axes of transmitting and receiving terminals 52 and 54.

Therefore, claims 5 and 13 are also considered obvious when JP '885 is combined with Hsu for the reasons previously mentioned.

Allowable Subject Matter

7. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: The primary reason for allowing claim 8 is the inclusion of a movable electrode unit hinged to the substrate, a first terminal separated from the upper surface of the driving electrode by a certain distance, and a second terminal connected to the movable optical waveguide so that the second terminal moves upward and downward. These features are not taught or fairly suggested in view of the prior art of record.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Patent No. 6,363,203 discloses a variable optical attenuator having a movable waveguide. Publication No. US 2004/0223717 A1 also discloses a variable optical attenuator having a movable waveguide. Publication No. US 2002/0076191 A1 teaches a method for obtaining a nearly linear response between attenuation and voltage for an optical attenuator.

Art Unit: 2874

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Omar Rojas whose telephone number is (571) 272-2357. The examiner can normally be reached on Monday-Friday (7:00AM-3:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rod Bovernick, can be reached on (571) 272-2344. The official facsimile number for regular and After Final communications is (703) 872-9306. The examiner's RightFAX number is (571) 273-2357.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Omar Rojas
Patent Examiner
Art Unit 2874

or
May 31, 2005